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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,731	02/09/2004	Tung-Shuan Cheng	TSMC2003-1129(N1280-00350	1527

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EXAMINER	
ZWEIZIG, JEFFERY SHAWN	
ART UNIT	**PAPER NUMBER**
2816	

DATE MAILED: 06/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/775,731	CHENG ET AL.	
	Examiner	Art Unit	
	Jeffrey S. Zweizig	2816	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 May 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 February 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Drawings

1. The proposed drawing corrections are seen to contain new matter and have not been entered.

2. Figs. 4A-4C and 5A-5C (described as "typical") should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The amendment filed 5/23/05 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material to paragraph [0025] is not supported by the original disclosure.

The additions to paragraph [0025] provide quite a bit of insight into the invention. However, Applicants dismiss these additions as plainly obvious in light of the original disclosure.

The disclosure must allow one of ordinary skill in the art to make and use the invention without undue experimentation and hoop jumping. When faced with a collection seemingly incompatible components as described in the previous Office Action, one should not be left to guess how the pieces of the invention might fit together. The disclosure should be clear. Examiner considers himself to be one of ordinary skill in the art. If the function of the invention as originally disclosed was plainly obvious, the enablement rejections would not have been made. The additions to paragraph [0025] cannot be reasonably assumed from the original disclosure.

Turning to the proposed drawing corrections, the additions to Fig. 4A are helpful, but not obvious. Again, if the existence of the output capacitor were plainly obvious in the original disclosure, the enablement rejections would not have been made. Note that the proposed correction to Fig. 4A is a bit confusing in that there are now two capacitor both with the same label "C". Also, the proposed correction to Fig. 7D does not appear to differ from that originally filed.

Applicants discuss additions to paragraph [0030], however, such an amendment was not found in applicants' reply. But the proposed amendments to paragraph [0030] appear to contradict the original paragraph [0030] which states "Fig. 5A presents a typical charge pump 500 which receives two pumping signals from the (singular) D/A converter 400". It would be unreasonable to expect one to interpret that as meaning a pair of complementary converters 400 without some undue confusion and head scratching.

Applicant is required to cancel the new matter in the reply to this Office Action. However, the new matter goes a very long way toward clarifying the invention. Perhaps a continuation-in-part would be best.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The relationship between the claims oscillator, DAC and charge pump appears to be at least partially enabled by the new matter described above.

6. Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. Elements critical or essential to the practice of the invention, but not included in the claims is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

Claim 1 recites a digital to analog converter coupled to the oscillator for generating one or more analog signals of predetermined voltage level based on the pumping signal as configured by a set of inputs thereof; and a charge pump coupled to the DAC for producing a dc output based on the analog signals.

The disclosure does not properly enable one of ordinary skill in the art to understand how one or more analog signals of predetermined voltage level are generated or how a dc output based on those analog signals is generated. Insofar as understood, the analog signals are directed toward the output of DAC 306 (Fig. 4A) or the input to charge pump 310 (Fig. 5A). The DAC disclosed in Fig. 4A does not show an output, however, the output is presumably the common node of the three capacitors. Fig. 4C appears to show a varying voltage output. This in itself is not understood as the circuit shown in Fig. 4A appears to be configured to provide a varying charge output, not a varying voltage output. It is not seen how the output voltage would vary as the pull up transistors are all connected to the same Vcc. In any event, the DAC shows only one output whereas the charge pump requires two inputs CLK & CLKB. One of ordinary skill in the art could generate CLKB from CLK with a simple inverter, however, as pointed out above, the DAC appears to produce a varying charge output, not a varying voltage output. A mere inverter would not effectively transmit such a charge transfer. Since the specification is silent as to exactly how the circuit shown in Fig. 4A would interface with the circuit shown in Fig. 5A and since the two circuits appear to be incompatible, the nature of the claimed analog signals cannot be understood.

The disclosure does not properly enable one of ordinary skill in the art to understand how the pumping signal is to be configured by a set of inputs. Insofar as understood, the pumping signal is directed toward the output of oscillator 302 and the set of inputs is directed toward the input to code converter 308. The specification ambiguously describes the output of code converter 308 as a set of finely-divided thermometer signals. No further definition is provided. Thus the nature of the signals 316 is unknown. Control module 304 combines the pump signal and signals 316 to provide outputs to DAC 306. However, the specification provides no explanation as to the nature of module 304's construction or function. The specification is also silent as to the nature of the signals output from module 304. Thus the nature of the signals output from module 304 is unknown. The specification indicates that components 304, 306 and 316 may be combined into a single unit as shown, for example, as 702 in Fig. 7A, however, such a DAC would be quite unconventional. The inner working of such a device cannot be dismissed without further explanation. As best understood, an object of the present invention is to selectively modify the amplitude of a square wave in discrete increments. Describing such a circuit as a digital to analog converter is questionable. Thus, it is not known how the pump signal is configured by a set of inputs.

Claim 1 and dependent claims 2-11 are not properly enabled.

Claim 12 has the same problems. Claim 12 and dependent claims 13-16 are not properly enabled.

Claims 17-20 have the same problems and are not properly enabled.

Additionally, claim 11 recited a voltage doubler. No voltage doubler has been disclosed. As best understood, the "voltage doubler" is directed toward component 704 shown in Fig. 7A. As shown in Fig. 7D, the voltage is not doubled. The output voltage from 704 is not doubled, but is the sum of a varying input voltage and a fixed voltage Vdd. Claim 11 is not properly enabled.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 4, 5, 10 & 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Chow (6,002,599).

As best understood, Fig. 5 discloses an oscillator (inherent) for generating a square pump signal within a predetermined operating voltage CLK, analog signals o1 & o2, a set of inputs Vin & Vref, and a charge pump 32 with a dc output Vpp as recited in claims 1, 4 & 5. As best understood, the recited DAC is directed toward a circuit for modifying the amplitude of the pump signal. Fig. 5 discloses a "DAC" 31 that functions as recited in claim 1.

The DAC has a predetermined number of inputs (2) based on a predetermined number of steps (1) as recited in claim 10.

As best understood, the output from the "voltage doubler" 32 is the sum of the input and supply voltages as recited in claim 11.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chow in view of Katsuhisa (USPN 6,762,640).

Chow does not appear to disclose a load capacitor as recited in claim 2. However, charge pumps with load capacitors are common in the art. Katsuhisa Fig. 3 shows an example load capacitor C0. It would have been obvious to one of ordinary skill in the art at the time of the invention to add a load capacitor to Chow as taught by Katsuhisa for the benefit of filtering the output voltage from the charge pump. Claim 2 is obvious.

11. Claims 3, 6, 12, 14, 16, 17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chow in view of Komiya et al. (USPN 6,714,065).

Chow does not appear to disclose a ring oscillator as recited in claim 3. However, charge pumps with ring oscillators are common in the art. Komiya et al. Fig. 5

shows an example ring oscillator 101. It would have been obvious to one of ordinary skill in the art at the time of the invention to add a ring oscillator to Chow as taught by Komiya et al. for the benefit of providing the pump signal CLK. Claim 3 is obvious.

Chow does not disclose a negative charge pump for substrate biasing as recited in claim 6. As pointed out in Applicants' background of the invention, the application of negative voltages to substrates is known. Further, it is commonly known that a charge pump's output polarity may be reversed merely by reversing the polarities of the charge pump's transistors and supply voltages. Komiya et al. Figs. 2A, 2B and 3-8 show examples of this procedure. It would have been obvious to one of ordinary skill in the art at the time of the invention to reverse the polarity of Chow's output as taught by Komiya et al. for the benefit of providing negative voltage to bias a substrate and prevent device leakage. Claim 6 is obvious.

Claims 12, 14, 16 and 17 are obvious for the reasons above.

Chow and Komiya et al. do not appear to specify voltages as recited in claim 20, However, those of ordinary skill in the art are intuitively motivated to optimize their circuits for best performance. It would have been obvious to one of ordinary skill int the art at the time of the invention to select a desired bias voltage for the benefit of optimizing leakage current. Claim 20 is obvious.

12. Claims 13 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chow in view of Komiya et al. and Katsuhisa.

As per the reasons above, it would have been obvious to add a load capacitor as taught by Katsuhisa to the combination of Chow and Komiya et al. Claims 13 and 18 are obvious.

Response to Amendments and Arguments

13. The enablement rejections remain largely unchanged. The amendments to paragraph [0025] do not clarify the operation of component 308 or the thermometer signals. It is not clear if the claims rely on these elements. Many of Applicants' arguments are moot since the proposed drawing corrections have not been entered and the proposed amendments to paragraph [0030] were not found.

Some enablement rejections were withdrawn in light of the amendments to the claims.

With respect to claim 11, a voltage doubler circuit may be able to function as an adder, but no voltage doubler circuit is disclosed. Since the claim does contain the appropriate functional language, the term "voltage doubler" should just be deleted.

With respect to the 102 rejection, as pointed out in the rejection, as best understood, the recited DAC is directed toward a circuit for modifying the amplitude of the pump signal. Chow Fig. 5 discloses a "DAC" 31 that functions as recited in claim 1. Within the context of the terminology of the present invention, CLK is seen as a digital input and o1/o2 are seen as analog outputs with amplitude modified by another input vfb.

Conclusion

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey S. Zweizig whose telephone number is (571) 272-1758. The examiner can normally be reached on Monday thru Thursday 6:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy P. Callahan can be reached on (571) 272-1740. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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JZ